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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/818,123	03/27/2001	Frank Sauer	2001P05535US	8633

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Siemens Corporation
Intellectual Property Department
186 Wood Avenue South
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EXAMINER

GOOD JOHNSON, MOTILEWA

ART UNIT	PAPER NUMBER
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2672

DATE MAILED: 01/28/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/818,123

Applicant(s)

SAUER, FRANK

Examiner

Motilewa A. Good-Johnson

Art Unit

2672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 September 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 8-14 and 17-30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 8-14 and 17-30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is responsive to the following communications: Application, filed 03/27/2001; Amendment A, filed 06/30/2003; Amendment B, filed 12/05/2003; Amendment C, filed 03/24/2004.

This action is made final.

2. Claims 8-14 and 17-30 are pending in this application. Claims 8, 19, 23 and 27 are independent claims.
3. The present title of this application is "Augmented Reality Guided Instrument Positioning with Depth Determining Graphics" (as originally filed).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 8-14 and 17-30 rejected under 35 U.S.C. 103(a) as being unpatentable over Fukunaga, U.S. Patent Number 6,346,940, "Virtualized Endoscope System", 02/12/2002, filed 02/27/1998, in view of Manwaring et al., U.S. Patent Number 5,638,819, "Method and Apparatus for Guiding an Instrument to a Target", 06/17/1997.

Regarding claim 8, Fukunaga discloses an apparatus for augmented reality guided instrument positioning, comprising: a graphics guide generator (col. 7, line 65 – col. 8, line 10) for generating a first graphic target.

Fukunaga further discloses (col. 2, lines 45-58, preparing a shape of an image with a hidden surface) (col. 2, lines 64-65, a guiding marker preparation unit displaying guiding markers) (col. 2, lines 66-67, guiding markers used to guide the insertion of an actual or virtual endoscope) (col. 2, lines 59-63, a compass image preparation unit which generates a compass image over a first image) and further discloses in col. 2, lines 1-7, even if the position is known the depths are difficult to discern and a user would have to estimate the depth of a cavity before advancing an endoscope tip.

However, it is noted that Fukunaga fails to disclose depth marker indicating a first target depth of a hidden target, and a graphic instrument depth marker indicating a depth of an instrument; and a rendering module for rendering a virtual view of the first graphic target depth marker overlaid on an actual view of an object including the target, and rendering a virtual view of the graphic instrument depth marker overlaid on the actual view such that a proximity of a predetermined portion of the instrument to the target is ascertainable based on a position of the graphic instrument marker with respect to the first graphic target depth marker.

Manwaring discloses position data that informs the user of the instrument in relation to X,Y,Z coordinate system, Z being depth, of the distance between the instrument and a target, col. 5, lines 40-45, and knowing at any instant the location of the instrument to the alignment feature, col. 6, lines 23-35.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include the depth information, as disclosed in Manwaring, of the instrument, alignment and target, as a marker, in the guiding marker preparation unit disclosed in Fukunaga, overlaid on the view of the target to ascertain the position of the instrument with respect to the target depth marker, to allow an operator to quickly and easily obtain guiding images for guiding an instrument through the actual cavity.

Regarding claim 9, Fukunaga discloses graphics proximity marker generator determines an optimal location for the predetermined portion of the instrument with respect to the target and calculates the proximity of the predetermined portion of the instrument to the target based on the optimal location. (col. 2, lines 53-58, preparation unit displays a focus mark, which Examiner interprets as a graphics proximity marker, to mark a condition inclusive of the location of the condition in the object , because the mark is inclusive of the location, Examiner interprets the focus mark as being proximate to the predetermined portion of the instrument based on an optimal location)

Regarding claim 10, it is noted that Fukunaga fails to disclose the graphics guide generator determines a second graphic target depth marker indicating a second target depth of the target, rendered as a virtual view overlaid on the actual view by the rendering module, wherein a distance between the virtual view of the first graphic target depth marker and the virtual view of the second graphic target depth marker is a predetermined target depth range of the target.

Manwaring discloses slices providing a reference to maintain a correct sense of orientation, col. 5, lines 14-16, and position data that informs the user of the instrument

in relation to X,Y,Z coordinate system, Z being depth, of the distance between the instrument and a target, col. 5, lines 40-45, and knowing at any instant the location of the instrument to the alignment feature, col. 6, lines 23-35.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include second depth information, as disclosed in Manwaring, of the instrument, alignment and target, as a marker, in the guiding marker preparation unit disclosed in Fukunaga, overlaid on the view of the target to ascertain the position of each surface slice in the target, to allow an operator to quickly and easily obtain guiding images for guiding an instrument through the actual cavity.

Regarding claim 11, Fukunaga discloses the proximity corresponds to a final forward position of the predetermined portion of the instrument with respect to the target. (col. 8, lines 1-10)

Regarding claim 12, it is noted that Fukunaga fails to disclose graphics guide generator generates a third graphic target depth marker, rendered as a virtual view overlaid on the actual view by the rendering module indicating an outer surface of the target, wherein the virtual view of the first graphic target depth marker indicates an inner portion of the target.

Manwaring discloses slices providing a reference to maintain a correct sense of orientation, col. 5, lines 14-16, and position data that informs the user of the instrument in relation to X,Y,Z coordinate system, Z being depth, of the distance between the instrument and a target, col. 5, lines 40-45, and knowing at any instant the location of the instrument to the alignment feature, col. 6, lines 23-35.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include second depth information, as disclosed in Manwaring, of the instrument, alignment and target, as a marker, in the guiding marker preparation unit disclosed in Fukunaga, overlaid on the view of the target to ascertain the position of each surface slice in the target, to allow an operator to quickly and easily obtain guiding images for guiding an instrument through the actual cavity.

Regarding claim 13, proximity comprises a first measure of proximity for indicating a front portion of the target and a second measure of proximity for indicating a back portion of the target, the front portion corresponding to entering the target and the back portion corresponding to exiting the target. (col. 8, lines 1-10, markers indicate the path to take, which Examiner interprets as including a front to back and back to front proximity)

Regarding claim 14, the graphic guide generator determines at least one graphics path marker that identifies at least one path for the instrument to the target; wherein said rendering module renders a virtual view of the at least one graphics path marker as an overlay on the actual view to which a portion of the instrument visible in the actual view is alignable. (col. 8, lines 1-10, markers indicate the path to take, and the type of guiding marker, and further discloses based on the viewpoint position and view direction the computation unit determines the position of the instrument for relative to an outer shape, view direction and reference direction, col. 13, lines 30-54, which Examiner interprets as an alignable feature)

Regarding claim 17, a graphic guide generator for determining at least one graphics path marker that identifies a path to the target, wherein the graphics path marker is a shape comprising a window, wherein the window marks the path. (col. 8, lines 1-10, markers indicate the path to take, and the type of guiding marker)

Regarding claim 18, a graphic guide generator for determining at least one graphics path marker that identifies a path to the target, wherein the graphics path marker is a pattern of lines centered on the target, wherein at least two lines are spaced differently from at least one other line, wherein the at least two lines frame the path. (col. 7, lines 65- col. 8, lines 10)

Regarding claims 19, 23 and 27, they are rejected based upon similar rational as above claim 8.

Regarding claims 20, 24, and 28, they are rejected based upon similar rational as above claim 10.

Regarding claims 21, 25, and 29, they are rejected based upon similar rational as above claim 10.

Regarding claims 22, 26 and 30, they are rejected based upon similar rational as above claim 14.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Response to Arguments

7. Applicant's arguments filed 09/27/2004 have been fully considered but they are not persuasive.

Applicant argues that Fukunaga fails to disclose or suggest overlaying a virtual image on an actual view. Fukunaga discloses an image processing system and real images displayed on the monitor, col. 5, lines 30-52. Fukunaga further discloses preparing an endoscopic image, which is an image of a three dimensional model which is a virtual representation of the subject, col. 6, lines 15-34. It is therefore the interpretation of the Examiner that Fukunaga discloses overlaying a virtual image, col. 6, lines 44-56, on an actual view, i.e. the three dimensional model, because the three-dimensional model is representative of the viewpoint and view direction represented by an endoscopic image.

Applicant argues that Manwaring fails to disclose or suggest rendering a virtual view of the first graphic target depth marker overlaid on an actual view of an object. Fukunaga discloses guiding markers used to guide the insertion of an actual or virtual endoscope col. 2, lines 66-67, a compass image preparation unit which generates a compass image over, i.e. overlaying, a first image col. 2, lines 59-63, and further discloses in col. 2, lines 1-7, even if the position is known the depths are difficult to discern and a user would have to estimate the depth of a cavity before advancing an endoscope tip, which Examiner interprets as suggesting a virtual view of a graphic target marker overlaid on an actual view. Manwaring discloses position data that informs the user of the instrument in relation to X, Y, Z coordinate system, Z being depth, of the distance between the instrument and a target, col. 5, lines 40-45, and knowing at any instant the location of the instrument to the alignment feature, col. 6, lines 23-35, which Examiner interprets as providing motivation to include depth marker overlaid on an actual or virtual view of an object.

Applicant argues that Fukunaga fails to disclose rendering or a rendering module for a rendering a virtual view of a path marker. Fukunaga discloses a computation unit and a preparation unit, in which the computation unit is used to prepare for display an indicator image showing the state of the virtual endoscope, see figure 4. Examiner interprets the computation unit as the rendering module, which generates the virtual image of the actual image, i.e. indicator image, showing a virtual endoscope view position, direction and depth marker, col. 7, lines 3-39.

Lastly, Applicant argues that Manwaring fails to disclose a portion of the instrument visible in the actual view and the overlaid in the actual view. Fukunaga discloses guiding markers used to guide the insertion of an actual or virtual endoscope col. 2, lines 66-67. Manwaring discloses position data that informs the user of the instrument in relation to X, Y, Z coordinate system, Z being depth, of the distance between the instrument and a target, col. 5, lines 40-45, and knowing at any instant the location of the instrument to the alignment feature, col. 6, lines 23-35. Therefore it is the Examiner's interpretation that it would have been obvious to include the overlay of the instrument and depth-guiding marker to know at any instant the location of the instrument to the alignment feature.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Motilewa A. Good-Johnson whose telephone number is (703) 305-3939. The examiner can normally be reached on Monday, Tuesday and Thursday 9:00 AM - 6:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on (703) 305-4713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2672

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Motilewa A. Good-Johnson
Examiner
Art Unit 2672

mgj

A handwritten signature in black ink, appearing to read 'MR', with a long horizontal line extending to the right.

MICHAEL RAZAVI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600